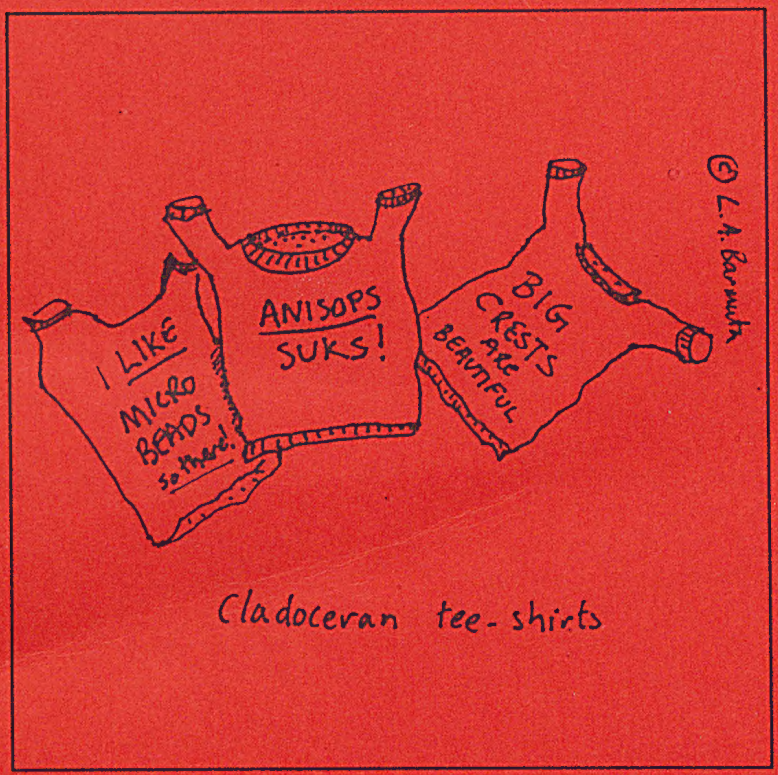
AUSTRALIAN SOCIETY FOR LIMNOLOGY INC

NEWSLETTER



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MEMBERSHIP DETAILS

The Australian Society for Limnology Inc. (ASL) is an association of over 400 people with professional or amateur interests related to Australian inland waters. Since its inception in 1961, the society has played an important role in fostering limnology in this country. The ASL promotes liaison between limnologists in academic, government and private institutions and has a vested interest in the conservation of aquatic and related resources. Annual conferences are held near centres of limnological interest, and the programme includes scientific sessions, field excursions and social activities.

The ASL regularly produces a newsletter with notes on limnological activities, articles of general interest, book reviews and announcements of upcoming events likely to be of interest to members. Occasionally, it produces a Special Publication series and a Directory of Members.

Membership applications are welcome from any person with an interest in limnology. Five classes of subscribing membership are available:

Ordinary members	$ 20.00
Student members	$ 10.00
Life members	$200.00
Institutional members	Fees on application
Sustaining members	Fees on application

Membership covers the period from 1 July to 30 June and all members receive the regular and occasional publications produced by the society. Members may also choose to receive the Australian Journal of Marine and Freshwater Science, the Australian Journal of Zoology and/or the Australian Journal of Botany at special reduced rates. The subscription for each journal is based on the calendar year in which the subscription is paid.

Enquiries relating to membership should be directed to the Membership Officer:

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22 Netherby Avenue
MULGRAVE VIC 3170 Ph. (03) 5604406 [Fax (03) 2113646]

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Material for publication in the June issue of the newsletter should be sent to the editors before the 31st of May 1991.

Contributions are welcome on any topic. Longer articles should be forwarded as unformatted text on IBM-compatible discs, or as formatted text in any commonly used word processing package (e.g. WordPerfect, Microsoft Word, Wordstar). All those with Macs, send hard copy and we ... sigh ... will type it into a real computer ourselves (I bet you wash dishes by hand too). Camera ready copy can also be sent.

Cover: No comment!

Editorial

THE FISH IS DEAD, LONG LIVE THE ....?

Hello again, and welcome to another issue of the ASL Newsletter. Once more, your diligent and hard working editors have put together an excellent edition [Nice of you to say that - *Eds*]. Just listen to what one reader said about the last one - "... even beats Sale of the Century ..." (W. Shakespeare, 14/1/91). Is any greater accolade possible?

As usual, the response to requests for comments on issues outlined in the last newsletter has left the postperson at ARI (headquarters of the Barmuta-Doeg Editorial Enterprises Inc) almost speechless. "What? You ask the members to respond to things that may affect the society, their professional future and the future of limnology in this country, and all you get is a tasteless and blatently sexist cartoon, a funny advert for Evian Water in a spray can, ..." more of that later "... entries for the Deliberate Mistake Competition ..." more of that later too "... and one reply from a state school graduate with a Collins Gem Latin Dictionary? Why do you bother?"

Why indeed! Scanning the last issue, the scorecard for comments on important issues reads as follows: Priorities for Water Research - 0; FASTS fees to rise - 0; Unsolicited book reviews - 2 (we suspect they only wanted the free copy); Buckets of cash from Gene Likens - 0. Not too bad if you're playing soccer for Sheffield Tuesday, but an Arsenal of a response from just under 500 dedicated, concerned society members.

In this issue, there are, as usual, many things of interest and importance (plus a few of the usual left-arm-over-the-wicket-leg-spin items). Things to look at, after you've headed straight for the plagiarized Larsons, include information on possible ASL workshops, a proposal to get more money for some of the important activities within ASL, the AGM Minutes from the Jabiru congress, and information and a registration form for the Lorne congress (if not, it will be coming real soon by separate post - all depends on printers etc). This year, we will be hopefully sending the abstracts out before the conference (seems like a good idea), so, if you are coming to the conference and intend on giving a paper, be sure to get those abstracts in well before time - or you just won't get a look in (also lets the Door Prize Committee decide beforehand who or what are the likely contenders). "What?", we hear you cry, "be organised?"

Also, as the ASL Newsletter moves into the corporate world of big business, we have sided with the SBS (for those of you in some states and parts of the country, SBS is a Government funded television station, specialising in films by Fredirico Fellini, and has recently - to the Editors' dismay - introduced limited advertising) and accepted a paid ad

(see enclosed flyer). The humble dollars we get from this will defray (great word!) the cost of producing and posting this extravaganza every three months.

With the conference fast approaching, there may be a need to help some interstate visitors get from their point of arrival (Tullamarine Airport or Spencer Street Station) to Lorne. ASL will (hopefully) be putting on a mini-bus, but if any-one is willing to offer a lift to any poor stranded soul, please get in touch with the secretary.

Oh yes, one more thing. You! That's right. We're talking to you. So, you're reading the newsletter (and perhaps complaining that it's arrived a bit later than the copies for your colleagues). Well, just have a look at the cover of the envelope that this issue arrived in. Wait a minute? That's not your address! That's the address where you worked before. Oh, so you've forgotten to let the membership officer know that you've moved, have you? And we're still sending the newsletter to your last address and they have to send it on. So remember, let us know when you change addresses or jobs, and the normal efficient friendly service will be resumed at the earliest opportunity. Thank you.

The title of the editorial? Well, you'll just have to read the whole newsletter to understand it.

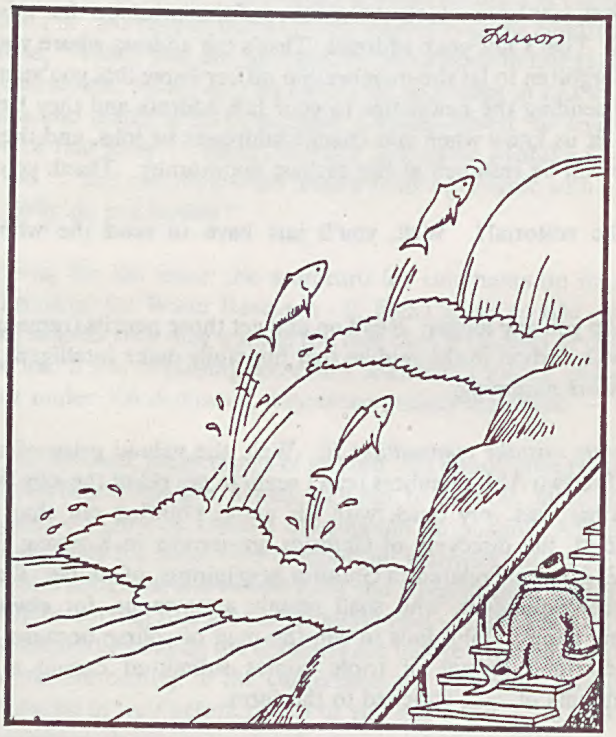
So we won't keep you any longer. Read on and get those pencils (remember them? - long skinny things with carbon in the middle that hopefully make intelligent marks on paper) or word processors humming.

Spot the deliberate mistake competition II: Well, the valued prize of a used ASL mug almost went off to two ASL members (can't seem to get rid of the silly thing!). One John Koehn of Victoria was very quick with his entry, pointing out that in the Victorian Scutpratrumorbutt, the discovery of *Galaxias brevipennis* in Koetong Creek was noted. This fish species is closely related to *Galaxias* brevipinnis, of course. Can't imagine what the Victorian correspondent, who shall remain anonymous, for obvious reasons, was possibly thinking about. John fails to win the mug of course because his entry did not follow the prescribed format of triple copies submitted during a full moon with appropriate amounts of cash attached to the form.

The second almost potential winner was Fran Sheldon from South Australia who, in this months Scutpratrumorbutt humorously points out the correct spelling of a traditional foodstuff in an island to our north. Unfortunately, Fran misses out on the mug because ... well ... because ... um ... well ... because we say so. Aah, the power!

Better luck finding the mistake in this issue. A suitable mystery prize is on offer once again - once we work out what it is.

THIS IS THE ASL, THAT'S LIFE



RUMOUR, PRATTLE AND SCUTTLEBUTT

SOUTH AUSTRALIA

Correspondent: Fran Sheldon, River Murray Lab, Dept. of Zoology, University of Adelaide, GPO Box 498, Adelaide 5001.

Like all true aquatic bugs in arid regions many South Australian limnos appear to have either migrated or taken refuge for the summer. A few have returned and with a small amount of coaxing others have been prised out from offices where they claim to have been writing (what's that?!).

Keith Walker has recently completed a chapter on a "Semi-arid lowland river, River Murray, Australia" for the Rivers Handbook, and a chapter for "Management and Conservation of Rivers", the proceedings of the conference in York, September 1990. I have searched everywhere for Prof. Williams but fear he is a threatened species, rumour has it that he is overseas (not again). He recently attended the Wetlands Workshop in Newcastle NSW, and then left for a world record attempt at bravery by flying Garuda before boarding an Aeroflot flight to Moscow, USSR, where he is part of the second UNEP (United Nations Expert Panel) on the Aral Sea [he could have tried for a connecting flight with CACC or Gulf Air for extra bravery points - *Eds*]. He returns for a few days somewhere in the future and then heads to Bolivia for the Fifth International Symposium on Salt Lakes. Mike Geddes appears to be having some trouble stepping down as Departmental Head, he was last seen still sitting in the Head's Office wearing the Acting Head's hat.

Amongst the Zoology postgrads, in December I took a 5 week migration to Laos and Cambodia. I justified my (dare I say) holiday by sitting around on the banks of the Mae Kong (Mekong) River watching the enormous variety of aquatic bugs (enormous belostomatids, and a multitude of aquatic snails) that are caught and consumed by the locals. Jim Puckridge has just returned from his final (migration) field trip to Coongie Lakes, and, yes, it rained. After experiencing floods or heavy rains on nearly every field trip to the Strezlecki Desert, a few of us in the Zoology Dept. are considering hiring JTP and his flood and rain producing talents to drought stricken areas of North Africa. In the Yab Lab Richard Musgrove occasionally appears from beneath a pile of equipment to manipulate the diets of his juvenile yabbies.

Andrew Boulton has recently returned from Arizona where he taught limnology for five months to third year and postgraduate students. He also embarked on a study of the

hyporheos of Arizonan desert streams which had hitherto been considered to be depauperate and he finished up collecting some 56 taxa. He also examined the vertical, lateral and longitudinal distribution of the hyporheos in three reaches of Sycamore Creek, Arizona, studied the influence of flash floods and drought on the hyporheos and hyporheic water chemistry, and conducted an experimental study on subsurface migration pathways. Apparently it was not all work and no play as he took time to marvel at wild otters off the Californian Coast and wild beavers in the east. After doing all this he still had time to become a dedicated follower of the Grateful Dead - watch out for tie-dyed T-shirts.

A new batch of Honours students has taken over all available chairs at morning tea. Some wet projects include: oxygen and turbidity tolerance of prosobranch and pulmonate snails (Michelle Jenkins), habitat separation of the shrimps *Paratya australiensis* and *Caridina mccullochi* in the River Murray (Tim Morris), hyporheossy [¿Que? - *Eds*] things in a sandy bottom arid stream (Marcus Cooling), incidence of insect damage on blackbox and redgum seedlings (Stephen Eldridge), faunal diversity in two freshwater swamps in the southeast (Giles Flower), and parasites on yabbies (Jillian Caughey).

Over the car park in the Botany Dept, George Ganf's merry band of students continue to create havoc around Bool Lagoon. Peter Adcock has started an Honours project to investigate the suitability of different aquatic macrophyte species for tertiary sewage treatment. Dr Chester Merrick has taken up a position at Warrnambool (notice the bool bit!!) [Note: we didn't make that last comment - *Eds*]. Apparently Marcus Brownlow is setting his sights on a career in the supermarket industry, he has been seen "barcoding" *Typha* sp. and *Phragmites* sp. to follow their seasonal demography!!. Naomi Rea is still writing.

At the State Water Laboratories (E&WS) Phil Suter, Peter Goonan and Jenni Beer have recently completed a preliminary study of eight degraded wetlands on the River Murray floodplain between Renmark and Mannum. Clare Nicholsen and Jason Cater of the Department of Environment and Planning are conducting a study into the rehabilitation of riparian vegetation in Berri, Dishers Creek and Boolyong Island [Why not make the bool "joke" again? - *Eds*] evaporation basins. Bryan Pierce of the SA Dept of Fisheries could not be contacted but rumour has it that he has discovered a way of coaxing carp out of wetlands!!!

Incidentally, I'm not sure that "frantic" is the right way to describe my (Naomi Rea) writing up (Dec. issue), it's more the laid back approach, literally. Was this a Fran-antic or zoological imagination? The botanists have been continuing investigations into the role of water regime. The exposure and inundation regime required for the germination and recruitment of *Triglochin procerum* seeds was examined by Douglas Beckers (UNE) over summer, while the requirements for seeding establishment is being looked at by Tim Kildare. Peter Adcock has a project involving *Baumea articulata* and *Phragmites australis*

in sewage ponds and Alison Hay and Giles Flower will identify floristic indices of disturbed and "pristine" wetlands in the southeast [Hay and Flower are looking at floristics ... who do you think you are kidding? - *Eds*].

In the "Spot the Deliberate Mistake" Competition, December Issue we thought we were going well when we came across Jane Growns taking a hard-eared break on page 9, but nothing compares to how long it would take to collect a kilo of coleopterous testicles (December issue page 18), perhaps it would be easier to buy the mass spec!!

PS. beetle-nuts are actually spelt betel-nuts [We knew that!! Ms Sheldon wins an all expenses paid bus trip to Elizabeth Downs for her diligent proof reading - *Eds*].

VICTORIA

Correspondent: Leon Barmuta, Bass Strait.

Well, well, well: three lentic holes or just a fevered, unwell co-editor trying to think of something to say?

First up, at Melbourne University's CEAH, Nancy Gordon has just successfully completed organising two excellent hydrology workshops starring Bob Newbury from Canada; she is also close to finishing the Great Big Book on everything we should know about fluid mechanics and hydraulics and John Wiley will be the lucky publishers. Don't forget Chris Gippel's upcoming workshop on Large Woody Debris (snags): should be a sizzler.

Welcome Chester Merrick, who has just started a lectureship as an aquatic botanist at Deakin University in Warrnambool [No, we still don't get the bool "joke" - *Eds*]. Good luck as all those eager first years swamp that not-quite-written-yet course!

Monash (Clayton) is humming with Sabine Schreiber, Barbara Downes and Julie Smith all trying to keep Sam Lake and Gerry Quinn under control in disturbance projects in both the Acheron system and Lake Purrumbete. Downes-Lake-Quinn Paving Contractors have deposited some 400 bricks into the latter; Victoria is set for an economic recovery led by NuBrick Pinestone Pavers. Sanity prevails for Barbara, at least, as Jacqui Jordan writes up and completes her honours on grazing interactions between stream bugs; the total effect has been to bewilder North Carolina visitor, Seth Reice. Followers of *Daphnia*'s cyclomorphotic gymnastics will be join us in congratulating Michael Barry in completing his thesis. Monash (Caulfield) hums on ARC-oiled wheels too; a spate of recent job ads will keep Hart, Campbell, Edwards and Beckett busy, while Kim James tries

to get the money from a certain state government agency for her saline wetland experiment.

Seven Creeks saw some feverish activity as Trout Cod were relocated immediately after the bushfire in the Strathbogies in an attempt to prevent the population from being killed by the next shower of rain. We hope the fish are doing well. South of the Divide, Tim Doeg has attempted (in vain) to sever two of his fingers (the ones used to indicate displeasure in international sign language) with a star-picket. Undaunted he valiantly tried to set up a siltation experiment two weeks later, only to have another Government Agency flush its weirs out all over said experiment. With collaborators like these... What else is happening in Conservation and Environment remains obscured by clouds of dust created by the latest reorganisation - or was the cloud of dust created by the collapse of a Pyramid or two?

Meanwhile at the Rural Water Commission, Vince Pettigrove has submitted a report on the distribution and ecology of *Thaumatoperla flaveola* to ANPWS. Phil Mitchell and Harry Clark have given the EPA a draft report on the environmental condition of Merri Creek, one of the yummier urban drainages in Melbourne, and Rhonda Butcher is about to spend another six weeks in the field generating a few more bug samples for the EPA. Roger Croome reports that he is "up to [his] ears in blue-green algae"; he has prepared information packets on blue-greens and their toxicity and is involved in the training of water supply operators and engineers to recognise and treat the problem.

Finally, this is the last of my Victorian contributions for a few years: I am off to the University of Tasmania to be a lecturer in the Department of Zoology for 5 years. Many thanks to all my sources for their help over the last year or so, especially Gary Bennison, Richard Marchant and Tim Doeg. Scuttlebutt correspondents should note, however, that I will still be hounding them every 3 months for their gossip and wisdom. Doeg-Barmuta Editorial Enterprises will be using New Technology to keep your newsletter more interesting than the average gas bill.

NORTH QUEENSLAND

Correspondent: R.M. St. Clair, Dept. Zoology, James Cook University, Townsville, 4111.

We have had what is hopefully an auspicious start for limnology in Townsville this year. This wet season is the wettest on record and it's still raining. There is an emphasis on theoretical limnology at present and, with all roads out of the city cut, the terrestrial biologists have likewise developed a theoretical bent.

The tourism industry is not going well, so Lee Benson is forced to be a limnologist during the flood. Fortunately, he has many samples that require sorting so filling in idle hours is not a problem. Richard Rowe continues his lab. study on the aggressive behaviour of damselflies. As most are proving to be very anti-social, he hopes the tendency for people to resemble their study animal can be avoided. The blitz on Birthday Creek (the Acheron of the North, L. Barmuta pers. comm.) continues pretty much as it was except that Jacqui Coughlan has swapped mosquitoes for crayfish and Birthday Creek for the Ross River Dam. This leaves room for Zoe Rosser to move in to do her Honours project comparing disturbance in Birthday Creek with a stream near Eungella. She will be comparing fauna of rocks with fauna of turned bricks.

Several projects are under way with the Centre for Tropical Freshwater Research. Paul Clayton continues his work for CSR on the effects of dunder [What the hell is dunder? Should it be the effect of dunderheads? - *Eds*] on the streams around Sarina, long after the dunder has taken its BOD on to the reef. At least he would if he could get there. His work on waterfalls continues despite the record wet, providing his flood bound companions with long and exciting stories of life threatening situations. By the way, the net he lost when last washed over a waterfall is expected to be carried south by the prevailing currents. It is clearly labelled so if anyone down there finds it could they please return it? Paul is always on the lookout for volunteers so anyone who wants a rainforest experience and a half should contact him.

A major new project is about to start on the Burdekin wetlands. These currently extend for four hundred kilometres along the Queensland coast (ABC News 20.2.1991), although it is anticipated the study area will be a little smaller. This is the result of a joint application with the Queensland Water Resources Commission to the Land And Water Resources Research And Development Commission (at least AWRAC was shorter). Bob Congdon will be extending his work on water quality of irrigation water into the Barratas into a larger (scope and area) project as a result. He will probably be aided in this by a new PhD student, George Lucaks, who will be looking into phosphorous export from irrigation waters (anthropogenic, not the current extensive natural irrigation) to the coastal ecosystem. Jacqui Nolan and Richard Pearson will be looking at a classification of the wetlands probably based on waterfowl and zooplankton. More on this project when people actually get started, apparently there is a bit of a hold up due to the funding body being unsure of what constitutes a milestone, and other important concepts.

John Faithful, Adam Goldrick and Jane Orr, now aided by Barry Butler, have continued to study the water quality for many of these projects. The major ones keeping them occupied at present are the CSR project on Dunder [Oh, it's a proper noun now, is it? - *Eds*] and work on the proposed Tully Millstream Hydro Dam. They also will increase their work on the Barratas wetland with the new funding.

We have had very few visitors lately, partly because of the weather no doubt. One notable exception was Dr. D. M. Scienceman who was on campus on Nov. 6 last year. Unfortunately [Sure? - *Eds*] we did not know of the visit until after he had left. We only knew of the visit because he listed all of H. Odum's publications on a blackboard in Biological Sciences, including one that refers to his newly coined word "EMERGY" which we think is defined by the equation E=NC (Scienceman 1987; Odum 1989). If we had known of the intended visit we would have notified people in an earlier newsletter. We do have a forwarding address if anyone is interested.

Odum, H.T. 1989 A systems overview of the University in Society. *Papers in Comparative Studies* 6:75-91. Ohio State University.

Scienceman, D.M. 1987 Energy and Emergy, in Pillet, G & Murota, T. (eds) *Environmental Economics*. Roland Leimgruber, Geneva. pp. 257-276.

[Wow! A scuttlebutt contribution with references, technical terms and formulae! We hope you don't put it down as a publication in your CV. - *Eds*]

PAPUA NEW GUINEA

Ross Smith reports from Mount Isa that he was unable to gather information for our information-starved readers owing to his "awaiting the birth of a new limnologist - Timothy William". One of the editors is flattered about the superior choice of first name, and both of us wish mum, dad and young Tim all the best. In his fax, Ross promises "to do better next time"; the editors fervently hope that this refers to news gathering. Stay tuned.

NEW SOUTH WALES

Correspondent: John Hawking, MDFRC, P.O. Box 913, Albury NSW (Fax: 060-431626)

University of New England

Autumn is fast approaching in New England, but we've had a good summer so far. Margaret Brock's seed bank experiments in Chinese food containers are producing results. We particularly like the "Barleyfields" chop suey although the "Mother-of Ducks" in blackbean sauce sounds appetising. Marg has just returned from a Wetlands Management Conference in Newcastle. Laurie O'Donnell seems to spend most of his time cursing computers, tentative pressing keys on the new keyboard and having the terminal look blankly back. Could this be a familiar experience to anyone else? Michelle Casanova

keeps hiding in her room pretending to write her thesis and looking busy, emerging only to grumble about muddy messes in the lab. Dorothy Bell is now into making mudpies from autoclaved soil and keeps finding the so-called "rare" *Isoetes* in every second lagoon. Students return next week so quite likely we'll all be buried under lecturing, tutoring and demonstrating until Easter.

Inland Fisheries Research Institute, Narrandera

FISHES AND FORESTS AND FLOODS!

Litter in the wrong places causes problems all around the globe, but on a local and more relevant scale, the problem appears insurmountable in my office. The pile of spontaneously generating sheets purporting to be "documents" which insist on cohabiting on my desk has grown to such proportions that I recently took an unseasonal, horizontal migration to the computer room. To my surprise, a sub-population of procreation-bent "documents" appears to have attached itself to my person and come along for the ride! So much so, I find that I have no alternative but to eradicate the errant weeds at their source and tidy my desk - but I think it can wait until tomorrow. Meanwhile, back to the subject of this diatribe: litter, or more specifically, forest litter.

This terrestrial source of organic material and nutrients comes into its own in the aquatic environment when floodplains are inundated, and the resultant bloom in plankton production which is supposed to occur is the piscatorial equivalent to Meals on Wheels. As a result, little fish grow into big fish and have more little fish of their own and live happily ever after or so the story goes. As is usually the case in biology, the real story is not that simple. For instance, inundated vegetation and litter decompose, and microbial respiration frequently reduces dissolved oxygen availability to dangerous levels. Add to this hypoxic soup a rich supply of polyphenols, especially condensed tannins, and the plot thickens. Tannins precipitate protein and can inhibit litter processing by fungi and macroinvertebrates just for starters. "Tanned" proteins in fish gills have only low permeability to oxygen, so fish already stressed by environmental hypoxia have to work harder to obtain oxygen. There is also evidence that polyphenols inhibit certain enzyme reactions (just ask Paul Boon). If carbonic anhydrase in fish gills in inhibited, then the fish will have difficulty excreting carbon dioxide, which will accumulate in the blood and tissues, and the fish will become acidotic to add to the stress of hypoxia.

But does all this conjectural physiology really happen? In a recent experiment I exposed golden perch larvae of varying ages to different levels of simulated litter fall in aquaria both with and without aeration. Not surprisingly, oxygen levels were lower in non-aerated tanks, and oxidative polymerisation ensured an interaction between oxygen levels and toxicity of polyphenols present. However, survival in control tanks with and without air was around 90%. In treatments with the average annual litterfall for river red gum,

survival in some treatments was as low as 0-15%. Even at one-third of the annual litterfall, mortality was significantly greater than in controls. Measured tannin levels fell within the normal range for inundated floodplain systems.

Clearly, litter accumulated on the floodplain can produce toxic effects in fish or larvae which become trapped by receding water levels, or which lack the ability to avoid potentially toxic or hypoxic habitats. Where does this leave the search for nursery habitats? Do fish use floodplain habitats as an obligatory phase of their life cycles, or alternatively, is floodplain utilisation driven by a more opportunistic decision-making process which enables fish larvae with poor swimming capabilities to avoid potentially lethal habitats? From the water quality angle, there appear to be three qualitative requirements for a flooded habitat to be suitable for fish: (1) a relatively small amount of litter and/or vegetation on the floodplain; (2) adequate water depth or flow to dilute toxic leachates to relatively harmless concentrations; (3) adequate oxygen to ensure that oligomeric phenolic compounds are readily oxidised to less reactive polymers. Future attempts to enhance fish production by flooding natural areas should take these points into account.

Murray-Darling Freshwater Research Centre

Activity at the Centre remains high, with the preparation for the caddisfly workshop, the influx of visitors and several the staff attending workshops. After the highly successful Mayfly and chironomid workshops the Centre held a third workshop and will host future workshops on an annual basis. Due to the large enrolment, the workshop was held in two sessions, session 1 on **Monday 25 and Tuesday 26** and session 2 on **Wednesday 27 and Thursday 28**.

The guest speakers at the workshop were Dr Arturs Neboiss (Museum of Victoria), John Dean and David Cartwright (Melbourne Metropolitan Board of Works), and Jean Jackson (University of Tasmania). The workshop focused on the taxonomy of both adult and larval Trichoptera and the format involved lectures on the operation of the new taxonomic keys followed by specimen identification by each of the guest speakers.

Some long awaited new keys were presented and will appear in the ASL Bulletin or Special Publications in the not too distant future. The presented keys were:

- "A guide to the identification of adult Trichoptera"
  by Arturs Neboiss

  "A key to families of Australian Trichoptera (larvae)"
  by John Dean and David Cartwright

"A key to the Hydrobiosidae and Hydropsychidae larvae"
by John Dean.

"A key to the Ecnomidae and Polycentropodidae larvae"
by David Cartwright.

"A keys to the Calocidae and Conoesucidae larvae"
by Jean Jackson

The workshop was a huge success and the keys will be a tremendous step forward for Trichoptera taxonomy. Planning is now under way for the workshop next year, which will be on Coleoptera, although there was a strong push for the aquatic elephants to get a guernsey.

Terry Hillman attended the "Habitat and Hydrology Workshop" at Marysville, and came away with an appreciation of how valuable a good hydrologist can be to biologists. Rod Oliver attended the Blue-green Algal Workshop in Sydney and David Mitchell attended the Workshop on Wetlands, Conservation and Management at Newcastle in February.

Our Russian visitors, Drs Vladimir and Lilian Matveev have commenced their research on Lake Hume, after spending an enjoyable few days with Bill Williams in Adelaide. They are measuring experimentally the impact of *Daphnia* upon the natural phytoplankton, as well as the predation of water mites and water bugs upon the *Daphnia*. They will try to determine the clearance rates of *Daphnia* under varying conditions of crowding, to establish direct density effects. The final aim is to link the interactions between the predators and herbivores, and to evaluate their impact upon the successions of phytoplankton.

Stuart Bunn recently visited the Centre to continue the field work on a joint CSIRO/Griffith University research project on energy flow in billabongs with Paul Boon and Terry Hillman. Research in Australia and overseas has shown that forest litter is often a major source of carbon, energy and nutrients for streams and rivers that flow through forested catchments. Similar inputs are probably important to food webs in billabongs, as they are often fringed by extensive zones of emergent vegetation. However, periodic dense blooms of phytoplankton occur in billabongs in response to seasonal variations in nutrients and temperature, and these may provide an additional source of organic matter. The relative importance of these two major sources of energy to food chains in billabongs has not been addressed. Stable isotopes of carbon and nitrogen are being used in this study to determine the sources of material and the pattern of energy flow in billabongs. This technique provides a powerful alternative approach to traditional methods of assessing food resources used by consumers.

CSIRO Division of Water Resources, Griffith

Kath Bowmer keeps busy, running our research program as well as groaning under the weight of several existing consultancies, plus another new one (from the Sydney Water Board), on *Ludwegia peruviana* control in Botany wetlands - Margaret Brock (UNE) and Surrey Jacobs (National Herbarium) are also involved. Two students have been working on her project over summer. Stuart Blanch has been using a novel seed-sampling device (involving a pump and screen sandwich) to collect seeds of different sizes. He has found that the minute seeds of the wood *Cyperus diffomis* persist in rice fields even with a 5-6 year rotation. Jon Sayers has been working on channel hydrology, attempting to measure tiny slope values for water surfaces. More recently, an eminent alien visitor (Vince Pettigrove, from some southern state) has begun to look at pesticide impacts on chironomid larvae deformities.

Some people have all the luck: Wolfgang Korth and Kath have wangled a trip to the USA to poach the latest pesticide analysis from the EPA, and attending the 3rd International Conference on Taints and Odours in LA [Junket! Junket! - *Eds*]. Gary Jones, meanwhile, has recently thrilled everyone by installing the first HPLC Rapid Spectral Scanning Detector in Australia, to analyze cyanobacterial toxins. Apparently, such detectors are more sensitive than the alternative Diode Array Detectors in use [But they can't be swapped for a kilo of betel-nuts in PNG - *Eds*].

Alan Chick, still located at Coffs Harbour, is in the pooh: he has just begun loading wastewater into his full-scale constructed wetlands, developed from earlier work with Peter Breen. This project is in a new flush of interest. The Hastings Shire Council has provided $200K for a feasibility study into the use of wetlands for wastewater treatment in the shire, while Hans Brix (University of Aarhus, Denmark) has arrived for a six-month visit at Griffith. He is working with Brian Sorrell and Philip Orr, using pressure sensors and flow meters to study convective gas flow in plants used for wastewater treatment.

IMPORTANT NOTICES

WORKSHOPS - YOUR COMMENTS, PLEASE.

In his 1990 presidential address, Rod Oliver suggested that A.S.L. was financially able to serve better its membership by contributing to specialized scientific gatherings or workshops. He appealed to the membership (that's YOU) for suggestions about potential topics for such workshops. The response has, as ever, been underwhelming, and so to kick things along Dr Oliver prepared the discussion paper reproduced below for executive approval. The executive thought that it was a good idea, and asked that the proposal be publicised in the Newsletter. John Beardall and Rod Oliver have made some phycological suggestions and also ask for your response below; in addition, John Hawking intends to run one on the taxonomy of aquatic coleoptera in Albury in early 1992. The executive would like to emphasise that the type of activity that could be sponsored is flexible: it could be a workshop, a specialised technical gathering, or sponsorship of a distinguished limnologist who tours all the major centres. Proposals can be made by any A.S.L. member at any time, and the executive will decide each year how many gatherings the Society can afford to sponsor in any one year. Please note that the maximum amount for any one gathering is at present $2000, and that the money is not available for general, unspecified expenses. This program will be up for discussion at the next A.G.M. in Lorne; if you have any opinions about these issues please write to the Newsletter, or tell the A.G.M..

GUIDELINES FOR WORKSHOPS

Guidelines for the use of A.S.L. funds to assist in sponsoring scientific meetings

Prepared by R.L. Oliver, February 1991; discussed and approved by A.S.L. executive on 1 March 1991.

Introduction: The Society currently has a capital investment of ca. $30,000 which is generating interest. The ASL Executive at its meeting in Kakadu decided that this interest should be used to provide sponsorship to appropriate scientific gatherings. The author suggests that the following guidelines should be instituted to control the use of Society monies for this purpose.

1. The selection of the scientific meetings to be supported and the monetary contribution to each will be decided by the ASL Executive. This decision will be made in the light of the following guidelines and in an attempt to fairly support the disparate groups which comprise ASL.

2. The maximum contribution to a single meeting will be $2000. Applications for support must clearly indicate the purpose for which the funds are required. It is not intended that each application should automatically obtain the maximum support.

3. Ideally the funds would be used for a single identifiable purpose such as the travel of an important participant who could not otherwise attend the meeting or assistance to selected students or hire of particular facilities or equipment necessary for the success of the meeting. It is not envisaged that the funds would be used for "general" support to meetings.

4. To be eligible for ASL sponsorship;

(a) the organisers of the meeting must be members of ASL.
(b) if participants are to be charged for attending the meeting ASL members will pay a reduced rate compared to non-members
(c) the proceedings of the meeting, including at a minimum abstracts of the papers presented, must be available to all ASL members at cost, either in the form of a booklet prepared by the organisers, as a volume of the ASL Bulletin or as a special publication in an international journal.

5. The ASL logo and the words "Sponsored by ASL" will appear on the front cover of a booklet of proceedings or at the start of any publication eminating from the meeting.

6. If a special speaker from overseas has been funded by the ASL money that person should be identified as the "ASL Visiting Scientist" or similar wording. Where possible the organisers should attempt to ensure that an ASL Visiting Scientist has the opportunity to visit as many relevant centres within Australia as possible.

7. Initially only interest accumulated from the capital which ASL has invested should be used for sponsorship purposes so that the capital base is not eroded. For special projects (similar to the ASL Book) the ASL Executive may at its discretion authorise the use of capital funds, but such projects must have the potential to make a profit and return such funds to the organisation.

WANTED: PROPOSALS FOR A WORKSHOP ON AQUATIC PRIMARY PRODUCTIVITY

Is there anybody out there who would be interested in participating in a workshop on a theme associated with aquatic primary productivity? It is envisaged that such a meeting would have a high experimental/methodology content as well as discussion groups and more formal presentations. If anyone is interested, please write to either: Dr R.L. Oliver, MDFRC, P.O. Box 921, Albury 2640, or Dr J. Beardall, Dept Ecology & Evolutionary Biology, Monash University, Clayton 3168. Suggestions for a specific topic for the workshop (hopefully the first of a series) will be very welcome. The first meeting will probably be held at Monash or Albury, depending on the final topic, but ideas for alternative venues will be considered. Possible themes include: Use of O_2 electrodes to determine primary productivity; primary productivity of microphytobenthos; pigment content and light capture; influence of mixing on primary productivity.

MONEY, MONEY, MONEY

At the executive meeting on 1 March, Leon Barmuta suggested that the next membership renewal form include two additional lines to allow members voluntarily to contribute a bit of spare cash to the student travel fund and to the A.S.L. "special scientific gathering fund". Currently, the student travel fund is funded by your membership contributions and the sum distributed has not kept pace with inflation. In addition, some members have been concerned that the proposal to fund the special gatherings from the interest earned on the Society's accumulated savings will, in time, deplete these reserves. Asking for voluntary contributions from members should help "top-up" these funds, and is a practice widely pursued by scientific societies elsewhere. Since this proposal involves money, we editors are not expecting an underwhelming response. The executive seeks your comments on this proposal; if no-one objects vehemently, we'll give it a burl.

NEW LOGO

The executive would like to see a new logo, publicise the Society with a wizz-bang (but cheap) poster and revamp our membership form. There are many more potential members out there, and what with scintillating meetings, exciting congresses, potential workshops and a brilliant newsletter [nice of you to say so - *Eds*], we should have even more people joining up! To expedite this membership drive we need artwork from our talented illustrators [are you listening Shirley Balla?], good black and white photos of limnologists at work and play [publishable ones, please, Campbell], and suggestions about how to publicise the Society [non-violent coercion techniques for use on graduate

students]. Silly of us to expect this, we suppose, but would you, our dear non-apathetic reader(s), care to respond to these pleas? We think Stuart Bunn has volunteered to coordinate graphic design, but even the editors will be delighted to receive your suggestions and contributions.

SPECIALIST GROUPS WITHIN A.S.L.

As part of the agonising soul-searching your hard working executive undertakes during the long, dark unfunded nights at their respective homes, a suggestion has come forth regarding the establishment of specialist groups within A.S.L.. "Why?" we hear you cry. "All the better to serve you, our members" comes the response. Such groups already operate within SIL (e.g. G.A.P.P., P.E.G.), and we already seem to have a de facto wetland group which held a mini-meeting at A.S.L. in Jabiru. There seem to be similar thoughts from some members about a flow group and/or a physical limnology group. Who knows, aquatic botany may once again blossom [sorry about that one -*Eds*] within A.S.L.? Such groups would cost A.S.L. nothing, could have their own little corner in the newsletter [cross our palms with silver - *Eds*], organise mini-meetings in the evenings at congresses, or even liaise with the organising committee of a congress for a special session or symposium. The idea is to give specialist groups the opportunity to get together and interest other members in their activities. Your reactions and suggestions are welcome [come on, make our next newsletter - *Eds*].

LWRRDC UPDATE

Further to the correspondence outlined in the previous newsletter where the secretary wrote to FASTS reqesting help in getting the ASL acknowledged as a representative organisation of LWRRDC, and then received a reply from FASTS Executive Director Dr David Widdup saying he had written to the Minister for Primary Industry and Energy, John Kerin, to request that LWRRDC have a "representative" of ASL. Well, Mr Kerin wrote to Dr Widdup and Dr Widdup wrote to the secretary.

In his letter (dated 2 Jan 1991), the Minister said: "The process of appointing directors of research and development corporations such as the LWRRDC is based in the first instance on recommendations to myself from an independent selection committee established for this purpose. In developing its recommendations for the board of the LWRRDC, the selection committee sought to achieve a balance of expertise in relevent areas, including management and conservation of natural resources, science and technology, environment and ecology, economics, finance and business management, as required under the Primary Industries and Energy Research and Development Act.

"I believe that the LWRRDC's board provides a good combination of relevent expertise. For example, it includes Dr Angela Arthington, a well-known and highly regarded limnologist who is a member of the Australian Society for Limnology. Another member of the board, Dr Diana Day, is a scientist trained in catchment hydrology and geomorphology while the Board's Chairperson, Dr Graeme Robertson, is trained in agricultural science."

The Board of Directors for the LWRRDC, announced on 7 September 1990, are:

- Dr. Graeme Robertson (Chairperson) - Commissioner of Soil Conservation, acting Deputy Director-General of the Western Australian Department of Agriculture.
- Ms Lyn Allen - worked extensively on ecological issues.
- Dr Angela Arthington - Associate Professor at Griffith University with a strong background in water and environmental research.
- Mr Don Blackmore - Chief Executive of the Murray-Darling Basin Commission, who is closely involved with natural resource management issues.
- Dr Peter Chudleigh - agricultural consultant who has had considerable experience in both the economic and practical aspects of resource management and research.
- Mr Don Dyer - chairman and board member of a number of businesses who has cosiderable finance and management experience, including implementing technology transfer projects.
- Dr Diana Day - senior policy analyst with the NSW Department of Water Resources, with a strong background in research into water and environmental issues.

Mr Bernard Wonder has been appointed Government Member of the LWRRDC. Mr Wonder is Head of the Land Resources Division of the Department of Primary Industry and Energy which is responsible for land and water issues.

60 MINUTES

Annual General Meeting. 22nd April 1990 Jabiru NT

Started at 1.30pm (p=proposed; s=seconded)

1. Agenda adopted (p: M.McKaige; S: J. Roberts).

2. Apologies: M. Hart, B. Hart, C. Heath, R. Norris, R. Tilzey, P. Osborne, L. Loyd, J. Harris, I. Small, R. Lim, D. Mitchell, T. Hillman, K. Bowmer, R. Shiel.

3. Minutes of previous AGM accepted (p:M.Barson; s: R.Smith). No matters arose from these minutes.

4. President's report: R. Oliver presented his report (see attatched) which will be published in a forthcoming newsletter. He finished by thanking R. Hyne and the OSS staff for the excellent organisation of the conference. He mentioned that response to R. Shiel's bibliography had been poor over the past year. Report accepted (p:R. Marchant;s: J. Davis).

5. Secretary's report: Apart from routine correspondence, the main item to report was (finally!) the successful incorporation of the Society in Victoria. To achieve this a change to the constitution (in addition to those voted on by postal ballot in Dec 89) had to be made. This concerned the circumstances in which a casual vacancy on the executive could arise. The Secretary read to the meeting the additional sentence that had to be added to the constitution and promised to publish this in the newsletter. He pointed out that as he was the public officer he had the legal right to alter the constitution so that it conformed to the requirements of Corporate Affairs, Vic., without consulting the members (a fact he did not know when he held the postal ballot). As this was the case it did not seem worth going through the formal procedures of the Society for alterations to the constitution. Report accepted (p: J. Davis; s: B. Pusey).

6. Treasurer's report: this was read to the meeting by the secretary because M. Hart was not present. The Society currently has 420 members of whom approximately 70% are financial. She hoped to have all accounts computerised by the end of the year. Report accepted (p:S. Bunn; s: M. Barson).

7. An honoraruim of $500 for the treasurer was proposed (A. Arthington; s: M. Mannion) and passed.

8. Auditor's report: this was read to the meeting by the secretary and accepted (p: L. Barmuta; s: J. Roberts).

9. Editor's report: the editor had received no objections to the changes in editorial policy discussed at the last AGM and published in a recent newsletter. Some taxonomic guides were likely candidates for future publications. Report accepted (p: T. Doeg; S: P. Horwitz).

10. Newsletter editor's report: J. Davis announced her retirement from this position and announced her successors: T. Doeg and L. Barmuta. She thanked: S. Balla, S. Rolls, A. Pinder, C. Hubbard, F. Whittles, S. Harrington, F. Christidis, J. Growns, M. Hart, for their help. The President thanked J. Davis for doing such a good job. Report accepted (p: R. Marchant; s: R. Oliver).

11. Jolly Award report: This was given by P. Cullen who reported that there had been no meeting or call for nominations this year. Report accepted (p: R. Marchant; s: R. Oliver).

12. Student award: The papers given by nine students were assessed. The winner was Mark Lund (Murdoch University). (T. Doeg, S. Bunn, M. Barson formed the judging panel).

13. Student travel award: Seven students were each awarded $350 by the society to enable them to present papers at Jabiru.

14. Door prize: This was awarded to J. Bywater. The door prize collective complained that few members indulged in bizarre antics at the conference and hoped things would improve.

15. 30th congress: it is hoped to hold this in Marysville, Vic, in the common University mid-semister break (late June to early July). Details are still uncertain and will be published in the newsletter.

16. 31st congress: Peter Davies offerred to host this in Tasmania. He suggested two venues and hoped to hold the meeting soon after Easter because the weather deteriorated markedly after this. Some discussion followed about the best time at which to hold meetins & other associated matters. The main points raised were that meetings should be held during common vacation periods, that meetings should not be immediately after Easter, that joint meetings (e.g. with ASPAB or AMSA) might be considered, and that if meetings were to be held in winter suitable cheap & warm accomodation must be available for students.

It was evident that guidelines for holding conferences are needed. The executive will provide these and publish them in the newsletter.

17. Election of the executive; the following were elected unopposed:

President:	S. Bunn	(p: J. Davis; s: L. Barmuta).
Vice President:	P. Davies	(p: J. Roberts; s: M. Barson)
Treasurer:	M. Hart	(p: R. Marchant; s: R. Oliver)
Secretary:	R. Marchant	(p: S. Bunn; s: P. Davies)

State members:

L. Barmuta (Vic)	(p. J. Davis; s: J. Chambers)
R. Norris (ACT)	(p: P. Cullen; S: L. Barmuta)
J. Hawking (NSW)	(p: R. Oliver; s: T. Doeg)
F. Sheldon (SA)	(p: J. Roberts; s: R. Oliver)
S. Halse (WA)	(p: J. Chambers; s: S. Lake)
P. Horwitz (TAS)	(p: P. Davies; s: O. Scholz)
R. Congdon (Qld)	(p: A. Arthington; s: M. McKaige)
B. Pidgeon (NT)	(p: C. Humphrey; s: M. Mannion).

19. Election of Auditors - Coles & Coster were elected (p: A. Storey; s: R. Oliver).

20. J. Davis proposed a vote of thanks to R. Oliver for his Presidency. (s: R. Marchant). This was carried with acclamation.

21. General Business:

a) A member (R. Smith) from PNG brought to the meeting's attention that there were active limnologists in PNG. It was suggested that he (or other PNG members) write a news column for the newsletter.

b) Newsletter editor (L. Barmuta) requested articles on new initiatives in limnological research or articles discussing research priorities that the Society might adopt.

c) It was suggested that members should spend 10% of their time publicising limnological research.

d) S. Lake (representing Ecol. Society of Australia) announced that a conference on Ecological Interactions would be held in Melbourne in Sept. 1990.

Meeting closed at 2.42pm. R. Marchant, Secretary.

STUDENT TRAVEL AWARDS

Applications are invited from research students for travel assistance to attend and present a paper at the 30th Annual Congress of the Australian Society for Limnology to be held at Lorne, Vic, from the 12-15 July 1991. The purpose of this assistance is to encourage students to present the results of their work in public. Students who are carrying out research in any branch of limnology for a higher degree are encouraged to apply. The following rules apply to this assistance:

1. Applicants must be full-time postgraduate students at any Australian University, College of Advanced Education or Institute of Technology. There is no age limitation. Applicants must have been current financial members of the ASL for at least 6 months.

2. Assistance will be granted on the recommendation of a panel of three appointed by the Society. This year a total of $2000 will be available for such assistance.

3. Applications must include a written statement of no more than 2000 words describing the research, its significance and the stage that has been reached. This statement must be endorsed by the student's supervisor. An abstract of the paper that applicant proposes to present must also be included.

4. Award of assistance will be judged on: (i) significance of the work; (ii) originality and soundness of the research; (iii) the progress made and whether the stage has been reached where something useful can be presented; (iv) ability to present a clear and concise statement of the study.

5. Applications must be lodged with Dr Richard Marchant, Museum of Victoria, 71 Victoria Crescent, Abbotsford VIC 3067, by the 30th of April 1991. Successful applicants will be informed by the 31st of May 1991.

CALL FOR JOLLY AWARD NOMINATIONS

The Jolly Award commemorates Hilary Jolly, a founding member of the Australian Society for Limnology and is presented to a person who in the opinion of the Society, has made an outstanding contribution to Australian limnology. The Jolly Award is the society's most prestigious award, considered by members to recognize scientific excellence and outstanding achievement.

Any person may be nominated for the Award, but nominations may only be made by financial members of the society. Nominations must be seconded by another financial member and must include a brief supporting statement and a current copy of the nominee's curriculum vitae. Nominations remain valid for three years. An award is not neccessarily made each year.

The full regulations governing the award appeared in a previous edition of the Newsletter (Volume 28, No. 1, February 1990).

Nominations are now called for the 1991 Award and should be forwarded, by 30 May, August to:

Dr. I. C. Campbell, Water Studies Centre, Monash University, East Caulfield 3145, Victoria. (Fax (03) 211 3646)

AN AUSTRALIAN WETLAND DIRECTORY

A FAX received from Max Finlayson, Assistant Director and Head of Wetland Division, International Waterfowl and Wetlands Research Bureau, Slimbridge, Gloucester GL2 7BX, England.

"In volume 28 (part 3, page 26) of the Australian Society for Limnology Newsletter, there is a comment from Michele Barson that Australia needs a wetland directory. Furthermore, Michele asks that Australians rather than (less knowledgeable) overseas persons should develop the directory. As my name is raised in this context I must rush forward with some good news for Australians. After discussions, that I initiated as an employee of IWRB, the Australian National Parks and Wildlife Service (ANPWS) has embarked upon an Australian wetland directory project. It is being coordinated by Dr Bill Phillips who is working through Concom and state/territory agencies. The money has come from sales of the "Kakadu Duck Stamp". As an Australian wetland ecologist with resident field experience in four Australian states/territories and as an employee of an international conservation organisation, I am particularly pleased to se ANPWS develop this initiative. If you want information on the project, contact Bill in Canberra (tel: 06 2500 200; FAX 06 2500 399; GPO Box 636). As he is a nice chap (sorry, bonzer bloke) I am sure he will tell you what progress has been made.

"I should perhaps explain the interest of IWRB in wetland directories. As an international non-government organisation, IWRB has sought to encourage or conduct wetland directories in a number of geographic regions. Successful ventures have included Northwest Africa and West Europe (1980), the Neotropics (southern America) (1986) and Asia (1989). We are currently involved in a collaberative project to produce a wetlands directory of the Oceanic realm (south Pacific Islands and New Zealand). We have also assisted with the Ramsar directories of wetlands of international importance (1987; 1990). The idea for the Australian directory came as a direct result of my employment at IWRB and involvement with the Oceanic directory.

"To return to Australia. Why did we choose to deal with ANPWS? it is simple; ANPWS is a Federal Agency and is the official contact organisation in Australia. As with all member countries, Australia has two national delegates on the IWRB Executive Board. These are Bill Phillips from ANPWS and Phillip Moors from the Royal Australian Ornothological Union (RAOU). Additionally Bill Williams is the Australasian representative on the IWRB Wetland Management Group panel. If you want more information on how all these bods link together, please contact me direct, subscribe to our glossy newsletter with its world wide reports [hey, competition! - *Eds*], contact any of the abovementioned people, await the next issue of the Newsletter or chat to me at the Wetlands Conservation and Management Workshop at Newcastle University, 11-15

February 1991 [Woops, missed that one. Just shows you the benefit of getting copy to the editors well in advance of the appropriate deadline - *Eds*].

"Bill Phillips also led the Australian delegation to the Ramsar Convention meeting in Montreaux, Switzerland [isn't that where Deep Purple wrote "Smoke on the Water"? - *Eds*] last June/July. At this meeting they discussed wetland classification (again, and at length - boring, boring ...??). If you want details of the Ramsar Convention, please contact Bill or write/FAX to Tim Jones (Ramsar Bureau, Slimbridge, Gloucester GL2 7BX, UK; FAX 44 453 697827). That is also my address, as Tim is the IWRB/Ramsar Liaison Officer."

Editorial Intervention: There the FAX ends, but I'm sure Max would like us to add a cheerio and a pip-pip to all his chums out here in the Antipodes. And perhaps he would like to explain how the International Waterfowl and Wetlands Research Bureau manages to end up with the acronym IWRB? What happened to the missing W? What does the W in IWRB actually stand for? Waterfowl or Wetlands? Never say the Editors aren't on the ball, or are scared to ask the hard questions! Should really end this with the classic Hinch at 7 sign off ... "On this day, we're the Editors, that's life" (sends a shiver down your spine, eh?).

GOL GOL SWAMP & LAKE GOL GOL
What Chance for Management?

David Harris, Department of Water Resources, Dareton, NSW

I Surface Water

Lake Gol Gol and Gol Gol Swamp are linked deflation basins of approximately 550 hectares and 425 hectares respectively, located north-east of Mildura adjacent to the River Murray. Before river regulation and irrigation, floods of greater than 57600 megalitres per day would have caused water to flow from the River Murray along Gol Gol Creek to the Swamp, and in turn, in extended high flows from the Swamp to the Lake.

With the development of irrigation in areas adjacent to the basins, regulators have been installed along the creek which now limit the flow from the river and prevent water passing to the swamp and lake. Where the creek used to feed the swamp, an earth bank now blocks the flow which is diverted to an irrigation supply channel which runs along the western edge of the swamp. This channel extends to the lake where it is prevented from flowing to the lake bed by a regulator consisting of a series of drop boards.

II Groundwater

Prior to river regulation, regional groundwater with a salinity level of 50,000 - 60,000 E.C. generally on the N.S.W. side flowed from a north-east to south-west direction toward the river. Since the construction of the Mildura weir, and the development of groundwater mounds beneath the irrigation areas, the groundwater flow has been altered, causing a change in flow paths of the groundwater system.

In September 1990, the water table at the centre of the Swamp was less than one metre below the surface. At the lake, the groundwater gradient is now away from the river and generally between one and two metres below the lake bed.

III Vegetation

Vegetation types differ considerably between basins except that in both sites the vegetation is in a state of serious decline.

In the Swamp, the bed is surrounded by a lignum (*Muehlenbeckia cunninghamii*) fringe which in turn is surrounded by black box (*Eucalyptus largiflorins*). The channel which feeds the Swamp bed is lined with black box and river cooba (*Acacia stenophylla*).

Adjacent to the channel the trees appear relatively healthy with access to freshwater seepage. In the Swamp bed, all mature box trees are dead, presumably as a result of the root zones saturated with highly saline groundwater. Younger box trees are surviving albeit in a restricted state resulting from saline groundwater and the absence of a flooding regime. The lignum is also in poor condition.

Water last entered the Swamp in 1981, 1984 and 1986, although this did not reach the fringe of box trees on any of these occasions. During the 1970's the Swamp was used to store water for irrigation supply.

The vegetation surrounding the Lake bed is dominated by River redgum (*Eucalyptus camaldulensis*). In localised areas these trees are dead. Water last entered the lake during the 1984 flood.

IV 1990 Flood Event

In early September 1990, flows in the River Murray at Mildura exceeded 60,000 megalitres per day and were expected to rise to about 100,000 megalitres per day and to last until mid-October. Block banks along Gol Gol Creek were breached to allow water to pass to the basin of Gol Gol Swamp. The Swamp was allowed to fill to a maximum capacity, holding an estimated 4,150 megalitres. Floodwaters inundated the lignum fringe and box

trees. Similarly, water passed into the southern portion of the lake bed, but did not pass to the entire bed and consequently did not reach the surrounding redgums.

Local field naturalists, who undertook to monitor birdlife reported a wide variety and significant populations of waterfowl and other wetland species at both basins.

Although not measured quantitatively, the vegetation showed clear evidence of new growth. Lignum which had previously appeared all but dead had significant growth as did younger box trees.

In November 1990, when the flood in the River receded, earth banks were reinstated to prevent water draining from the Swamp to Gol Gol Creek. Water in the Swamp was considerably more saline (1,050 E.C.) than the Creek water (230 E.C.) which provided irrigation supply to adjacent irrigation areas for vegetables, grape vines and citrus.

The basins, which had been acting as groundwater discharge sites through capillary action, had high concentrations of salts on the surface. As the basins filled with floodwaters, these salts were picked up and the resulting solution became very saline, in excess of 1,500 E.C., compared to the river at 230 E.C.

V Considerations for Management

During January 1991, saline water from the Swamp was found to be seeping to the adjacent irrigation supply channel. Irrigators suggested that this seepage caused significant damage to vegetable seedlings. Since then, water has been pumped continuously to the channel to maintain a pressure head higher than the Swamp to prevent seepage.

It is worth noting that during the 1970's when the Swamp was used to store water for irrigation, there was no reports of seepage.

Groundwater movement and salinity has been monitored prior to and throughout the flood event at a network of piezometers on and adjacent to the Swamp and Lake beds. Early analysis of groundwater salinity indicated a significant reduction in salinity levels in certain locations as a result of the inundation. This has provided a temporary resurgence in the vegetation in the Swamp and further monitoring will indicate whether a short term freshwater lens has been established above the regional groundwater.

In the longer term however, the future of Lake Gol Gol and Gol Gol Swamp is bleak. Continuing rise of saline regional groundwater will eventually reach the surface of the Swamp and, further into the future, to the bed of the Lake unless action is taken to intercept or stop this rise.

The management strategies for the basins will, no doubt, be aimed at maintaining wetland systems, retaining as much of their natural values as possible. This will then require a flooding and drying regime relative to 'natural' rises and falls in the River Murray.

However, flooding where the water cannot drain as the river recedes, may only be exacerbating the accumulation of salt on the bed of the swamp as the water evaporates. Further, inundation may also be contributing to the rise of the groundwater, allowing capillary action to bring saline groundwater to the surface.

Irrigation in the region is here to stay and the effects of the Mildura weir will also remain. Long term management options, must reduce the rise of the regional groundwater and establish a suitable flooding regime.

The solution to the rise of the groundwater may be in the installation of salt interception bores, which may be linked to the Buronga Salt Interception Scheme approximately 10 kilometres to the west. This would be an expensive option for what may be perceived as purely environmental purposes. By comparison, the Buronga Salt Interception Scheme serves to intercept salt water from reaching the River Murray.

Similarly, management of flows to and from the basins will provide challenges. Water used to inundate the basins, unless drained, will become increasingly saline. Any drainage strategy must be environmentally acceptable in its own right and not further contribute to the salt load of the Murray-Darling river system.

In conclusion, management options for the Lake Gol Gol and Gol Gol Swamp deflation basins must be developed as a matter of priority if degradation to the point of being salt pans is to be halted. However, just moving water to the beds of the Lake and Swamp, when available, is not the whole answer and could, potentially, do more harm than good.

ANNOUNCEMENTS

Australian Entomological Society 22nd Annual General Meeting and Scientific Conference. 14 - 19 July, 1991. University of Melbourne. Papers and posters are invited on the following themes and on all other apsects of entomology in Australia. Scientific theme sessions already arranged are: MONDAY 15TH JULY "The Impacts of Exotic Insects in Australia" with **Don Sands** on "Exotic insects as agricultural pests in Australia" and **Ross Field on** "Overview of exotic biological control agents in Australia". TUESDAY 16TH JULY "Vulnerable Environments in Australia With Particular Reference to Alpine and Aquatic Faunas" with **Richard Marchant** on "Vertical distributions of invertebrate communities in riverbeds", **Terry Hillman** on "Billabongs" and **Peter McQuillan** on "Insects in alpine environments". WEDNESDAY 17TH JULY "Genetics and Molecular Biology" when **John Oakeshott** and **Ross Crozier** will present keynote papers, "Modern Methods in Systematic Entomology" with **Peter Cranston** on "Basic Principles of Cladistics/Phylogenetics". The Charles French Memorial Address will be presented by **Dr T.W. Hogan.** THURSDAY 18TH JULY - General entomology. FRIDAY 19TH JULY - Excursion to Healesville.

Social events include the Welcoming Dinner, Cocktail Party and viewing of Butterfly Display at the Museum of Victoria, Address by Charles McCubbin, Annual Dinner, Excursion to Healesville Sanctuary.

Contact: Janet Horne (convenor) at the Institute of Plant Sciences, Swan St., Burnley, 3121, Phone (03) 810 1511 (w); fax (03) 819 5653 for further information and registration forms.

Q: What to do after Lorne? A: Three days at Bool Lagoon! (15-17 July 1991)

At a cost of a meagre $45, you will be accommodated in heritage shearers quarters and fed hearty farm cooking with, perhaps, a local Coonawarra drop to wash it down. All this in the relaxing environment of Bool Lagoon and in the company of an enthusiastic group of limnologists.

We would like to show you around, introducing the Mediterranean nature of the region and key biotic and abiotic characteristics that shape the extensive stands of wetland vegetation. We also wish to generate debate about the strategies aquatic plants adopt in order to survive and the function of individual plant traits. Your comments are welcome in discussions that will ensue in an informal and relaxed atmosphere.

The timing coincides between the finish of the ASL and the start of the Phycology and Aquatic Botany Conferences, and Bool Lagoon is situated conveniently about half way between Lorne and Adelaide, near Naracoorte (The ASPAB conference is being held in the Botany Dept, Adelaide Uni., see last newsletter).

For further details, contact: Naomi Rea (08) 390 3576 or George Ganf (08) 228 5292 at the Botany Department, University of Adelaide FAX: (08) 232 3297.

First Announcement The VIIth International Conference on Ephemeroptera will be held in Orono, Maine, USA (August 3-6 1992) on the campus of the University of Maine. Maine is known for its rugged and beautiful Atlantic coastline, extensive forests, lakes and rivers [what about Ephemeroptera? - *Eds*]. It is easily accessible by car and by air, with an international airport only 16 km from the campus. Oral and poster presentations are invited on the whole field of research on Ephemeroptera. Presentations will be published as conference proceedings. Informal sessions on special topics will be arranged, including one on mayfly photography (so bring your best photos).

The conference will be held two weeks before the 11th Symposium on Plecoptera in Wisconsin (August 17-20, 1992), so you can go to both. Accomodation is at the University dormitories (about US$30 a day for meals and rooms) although a number of motels, hotels and inns are also available. Furthur details will come in the second announcement. If you want to get this announcement, write to: K. Elizabeth Gibbs, Conference Convener, Department of Entomology, University of Maine, Orono, Maine 04469, USA before August 1st 1991.

Golden and Silver Perch: Do they Really Like Inundated Floodplains?

Here I am at the start of a project at the Inland Fisheries Research Station, Narrandera, to establish whether larval Golden and Silver Perch can actually be found on inundated, Murray-Darling, floodplains. If they can; thus lending weight to the floodplain recruitment model discussed by Peter Gehrke (Vol 28 No 3), then what happens next?

There are many reports of adult and large sub-adults of both species, moving upstream in response to an increase in flow rates, but where do all the juveniles go?

It seems to me that nobody has looked, but if any keen icthyolimnologists out there can shed light on "the case of the missing juveniles.....", please drop me a line.

Editors' Note: it would help if you let us know exactly who you are, "me". (John Hawking's fault, actually).

BOOK REVIEWS

Well (one lentic hole in the ground), here are two different views on the same book.

Introduced and Translocated Fishes and their Ecological Effects. D.A. Pollard (Editor). Australian Society for Fish Biology Workshop. Department of Primary industries and Energy, Bureau of Rural Resources, Proceedings No. 8.

Reviewed by: Colin R. Townsend & Todd A. Crowl, Department of Zoology, Otago University, Dunedin, New Zealand.

The Australian Society for Fish Biology clearly has an active and well attended programme of annual meetings. Since 1985 these have incorporated workshops on specific themes, none more timely or significant than this. The potential for ecological impacts of introduced or translocated species needs to be thoroughly understood and this workshop sought to identify some of the many gaps in our knowledge and to provide recommendations for future research.

However, turning the contributions of a workshop into a successful published volume is no easy matter. The process will not work well if the workshop has lacked structure or if contributors do not know where they fit into the whole picture. The quality of the final product also depends on editorial decisions about what to leave out and whether to ask for revisions to manuscripts.

These proceedings suffer from several shortcomings. We were disappointed to find that the texts of poster papers were included. Surely, posters are designed for display and immediate feedback at a meeting - in a book, their abbreviated form only serves to frustrate the aim of effective communication. The quality of other contributions is variable; some appear as lists of recommendations, others do not seem to have much relevance to the stated theme, and one even fails to provide any references. Early on we are treated to a definition that includes dinoflagellates as fish (they've got to be joking!) and later there is a misplaced account concerning crayfish. However, each section of the proceedings does contain examples of more thoughtful, and thought-provoking, contributions that have kept to the point and provided useful case histories or, better still, have attempted to come up with generalisations.

Special guest Walter Courtenay provides the highlight of the introductory section, giving an overview of the situation in the United States which now hosts 64 introduced (foreign) species and where 178 American species have been translocated to establish beyond their natural range. He notes that promoters of introductions often offer "socio-economic"

benefits as justification for species transfers despite the fact that, historically, direct benefits to people have been rare. Courtenay concludes with a strong plea for increased caution and the application of ecological knowledge to reduce risks to habitats and native species.

The lack of sound ecological information about the fate of introductions is a theme echoed in several papers in the second section, dealing with accidental and deliberate introductions to the wild. In his review of the long history of introductions to New Zealand, Bob McDowall notes that the evidence relating to impacts is limited and largely circumstantial. It seems to be usually the case that the study of introduced species, once established, assumes low research priority, yet understanding of the reasons for successful establishment and spread is vital if we are to make better decisions in future. Alexander Morison and Doug Hume's account of the spread and impact of carp in Australia is a useful and timely contribution in this respect. Angela Arthington *et al.* argue that it is commonly the case that introduced species are most successful in habitats modified or disturbed by human activities such as impoundment, desnagging, removal of riparian vegetation, sedimentation and thermal pollution. This is an interesting thesis worthy of further consideration and Arthington's plea is well made for research on the circumstances that influence the likelihood of successful establishment in modified and natural locations.

To avoid undesirable impacts of species introduced for aquaculture there is of course much to be said for first checking whether using a native might produce just as good results. Lance Lloyd takes this argument a step further by suggesting that native insectivorous fish should be evaluated before contemplating the introduction of an exotic as a mosquito control agent.

However, the unthinking movement of natives to new sites can raise its own problems, as described by Clive Keenan and John Salini's in the third section of the book about problems of translocations. Electrophoretic studies on barramundi have revealed the existence of multiple, genetically distinct stocks around Australia that may be of great significance to the emerging aquaculture industry. Keenan and Salini argue that it is vital to regulate the movement of live barramundi to prevent genetic deterioration of the existing wild stocks.

A brief fourth section deals with proposed introductions to the Sepik River in Papua New Guinea. It seems that since Independence PNG has become much more circumspect about fish introductions. John Paxton makes a plea that if there are to be further attempts to establish a commercial fishery, experiments with the native milkfish as well as the already introduced tilapia should be conducted before a further introduction is contemplated.

Walter Courtenay, who opened the proceedings, also closes them by reiterating the problem of a paucity of hard data on interactions between non-native and native fishes.

He argues also for increased research into fish population genetics - even though it may be some time before we understand the precise meaning of genetic differences for population viability and evolution. When it comes to making conservation action plans, Courtenay emphasizes the need to carry out a catchment by catchment appraisal. Just as with water-use and pollution problems, a state by state approach can lead to inappropriate, even stupid decisions, such as the one where one federal U.S. agency was providing funds to drain some wetlands while another was granting money to protect them!

Unfortunately, the title of the book (specifically the part about 'ecological effects') is a misnomer. Of the 5-6 papers that include any new information (we're talking data here), only the paper by Bludhorn *et al.* offers anything close to ecological information - we are treated to two figures and three short paragraphs. Ironically, the data suggest little or no diet overlap between the introduced and native species! The only other contribution with data (Keenan and Salini) suggests that habitat alteration (not introduced species) has possibly facilitated gene pool fragmentation in Barramundi.

This workshop personifies a persistent problem faced by scientists interested in seeing close scrutiny of species introductions...NO SUPPORTING INFORMATION!! This is the stuff fisheries managers dream of [and these sentences are the stuff editors have nightmares about; a squad of remedial English teachers are on their way to Otago right now - *Eds*]. Actually, data do exist (sensu Cadwallader, Jackson, Tilzey, Fletcher) and while they are not numerous and they do not generally provide direct mechanistic explanations, they do offer strong correlative information and insights into why caution should be exercised [on a leash? - *Eds*] when introducing new species. The overwhelming conclusion from this workshop (and all the others we have heard about) is that we need more direct studies...more experimental approaches to introduced species' effects. SO DO IT! We don't need any more meetings to suggest we need information -- WE NEED DATA!

The bottom line is this: the workshop proceedings are worth reading if it [*sic*] doesn't cost too much (or you happen to be an author).

Introduced and Translocated Fishes and their Ecological Effects.

Reviewed by: John Koehn, Freshwater Ecology Branch, Department of Conservation and Environment, Arthur Rylah Institute, 123 Brown Street, Heidelberg 3084.

As expected by the title, this publication presents papers on a variety of aspects of introduced and translocated fishes. In summary, topics included are: regulations, live fish trade, documentations of introductions, translocations and range expansions in various

areas, the role of habitat disturbance in the establishment of exotic species, dangers from hatchery releases and genetic implications.

Case studies for particular species include the Lake Eacham rainbowfish, cichlids, carp, *Gambusia* and more *Gambusia* (by guess who - Lance *holbrooki* Lloyd). Many of these papers provided clear advice or implications for management, a much welcomed inclusion.

Perspectives from the United States and New Zealand were provided by Dr. W. Courtney and Dr. R. McDowell respectively. McDowell provided details of many specific introductions to New Zealand, including the early talk of introductions of Murray Cod and Australian Bass from Australia. Concerns about introductions in general were raised as early as the 1870's. The risks posed by introductions such as habitat disruption, disease, behavioural interactions (e.g. competition) and predation were targetted by both authors, as was the paucity of data in these areas.

Unfortunately for this publication, many contributions appeared only as abstracts, providing little information compared to completed papers. This was a poor effort by those concerned and certainly detracts from the publication. Whilst some papers were a little slow to get to the point, and not many relevent questions were answered, the resultant list of recommendations provides an instant starting point for action.

For me, however, the highlight of this little bedtime volume was the enlightened introduction and summation by the guest speaker, Dr. Walter R. Courtney Jr. from Florida Atlanta University, USA. In an historical perspective from the US, he reveals that most introductions have occurred during the past 30 years. Discussions on the ecological dangers of introductions included the problems of managers being pressured by political and socio-economic "gains". He emphasised the unfamiliarity of "underwater weeds" in comparison to terrestrial weeds, the lack of information on effects and the list of ill-fated eradication programs.

In a worthwhile overview of the workshop, Courtney has to repeat many of these revelations in an Australian context. It seems that his introduction may have been somewhat prophetic.

The contributions by Courtney, information provided in particular studies, and the recommendation list provide a basis for improved management of fish introductions and translocations. Let's hope we begin to fill the gaps in our knowledge of their ecological effects.

LIMNOLOGY BIBLIOGRAPHY

1989

HARDISTY, M.W., I.C. POTTER & R.W. HILLIARD, 1989. Physiological adaptations of the living agnathans and their fossil representatives. *Proc. R. Soc. Edin.* 80, 241-254.

LONERAGAN, N.R., I.C. POTTER & R.C.J. LENANTON, 1989. Influence of site, season and year on contributions made by marine, estuarine, diadromous and freshwater species to the fish fauna of a temperate Australian estuary. *Mar. Biol.* 103, 461-479.

POTTER, I.C., F. BARONIE, R.J.G. MANNING & N.R. LONERAGAN, 1989. The distribution, growth and reproductive biology of the western school prawn, *Metapenaeus dalli*, in the Peel-Harvey estuary. *Aust. J. Mar. Freshwat. Res.* 40, 327-340.

POTTER, I.C., BECKLEY, L.E., WHITFIELD, A.K. & R.C.J. LENANTON, 1989. Comparisons between the roles played by estuaries in the life cycles of fishes in temperate Western Australia and southern Africa. *Env. Biol. Fish.* 28, 143-178.

TRAYLER, K.M., D.J. BROTHERS, R.D. WOOLLER & I.C. POTTER, 1989. Opportunistic foraging by three species of cormorants in an Australian estuary. *J. Zool., Lond.* 218, 87-98.

WHITFIELD, A.K., L.E. BECKLEY, B.A. BENNETT, G.M. BRANCH, H.M. KOK, I.C. POTTER & R.P. VAN DER ELST, 1989. Composition, species richness and structureof ichthyofaunas in eelgrass (*Zostera capensis*) beds of southern Africa. *S. Afr. J. Mar. Sci.* 8, 251-259.

1990

BARTELS, H. & I.C. POTTER, 1990. Communicating (gap) junctions between chloride cells in the gill epithelium of the lamprey, *Geotria australis. Cell Tissue Res.* 259, 393-395.

BARTELS, H., R.W. HILLIARD & I.C. POTTER, 1990. Strukturelle Anpassungen des Kiemenepithels von *Geotria australis* an Änderungen des äusseren Millieus. *Verh. Anat. Ges.* 83, 127-128.

BARTELS, H., I.C. POTTER & R.W. HILLIARD, 1990. A subepithelial nerve plexus in gills of the downstream migrating adults of andromous lampreys. *J. Submicrosc. Cytol. Pathol.* 22, 327-333.

COOK, R.D., R.W. HILLIARD & I.C. POTTER, 1990. Oral papillae of adults of the Southern Hemisphere lamprey *Geotria australis. J. Morph.* 203, 87-96.

COOK, R.D.,.R.W. HILLIARD & I.C. POTTER, 1990. Morphology and innervation of the buccal glands of the Southern Hemisphere lamprey, *Geotria australis. J. Morph.* 206, 1-13.

DOEG, T.J. & J.D. KOEHN, 1990. A review of Australian studies on the effects of forestry practices on aquatic values. *SSP Tech. Rep.* 5, 1-81. Silvicultural Systems Project, Dept Cons. & Env., Vic.

GAUGHAN, D., F.J. NEIRA, L.E. BECKLEY & I.C. POTTER, 1990. Composition, seasonality and distribution of the ichthyoplankton in the lower Swan Estuary, south-western Australia. *Aust. J. Mar. Freshwat. Res.* 41, 529-543.

GEHRKE, P. C. 1990. Spatial and temporal dispersion patterns of golden perch, *Macquaria ambigua*, larvae in an artificial floodplain environment. *J. Fish Biol.* 37, 225-236.

HALL, D.N. 1990. Assessment of the effects on fish habitat of experimental flow releases for hydropower generation in the Tanjil River, Gippsland. *Arthur Rylah Inst. Env. Res. Tech. Rept.* 109, 1-21. Dept Cons. Forests & Lands, Vic.

HALL, D.N., D.J. HARRINGTON & P.S. FAIRBROTHER, 1990. The commercial eel fishery in Victoria. *Arthur Rylah Inst. Env. Res. Tech. Rept.* 100, 1-41. Dept Cons. Forests & Lands, Vic.

HAWKING, J.H. & J.A.L. WATSON, 1990. First Australian record of chironomid larvae epizoic on larval Odonata. *Aquatic Insects* 12, 241-245.

KOEHN, J.D. 1990. A bibliography of research publications by staff of the Freshwater Fish Management Branch, Fisheries Division, 1970-90. *Arthur Rylah Inst. Env. Res. Tech. Rept.* 102, 1-19. Dept Cons. Forests & Lands, Vic.

KOSTE, W. & R.J. SHIEL, 1990. Rotifera from Australian inland waters. VI. Proalidae and Lindiidae (Rotifera: Monogononta). *Trans. R. Soc. S. Aust.* 114, 129-143.

LEATHERLAND, J.F., R.W. HILLIARD, D.J. MACEY & I.C. POTTER, 1990. Changes in serum thyroxine and triiodothyronine levels during metamorphosis of the Southern Hemisphere lamprey, *Geotria australis*, and the effect of propylthiouracil, triiodothyronine and ambient temperature on serum thyroid hormone levels of ammocoetes. *Fish Physiol. Biochem.* 8, 167-177.

LONERAGAN, N.R. & I.C. POTTER, 1990. Factors influencing the community structure and distribution of different life-cycle categories of fishes in shallow waters of a large Australian estuary. *Mar. Biol.* 104, 25-38.

PEN, L.J. & I.C. POTTER, 1990. The biology of the nightfish, *Bostockia porosa,* in a south-western Australian river. *Aust. J. Mar. Freshwat. Res.* 41, 627-645.

SHIEL, R.J. & W.D. WILLIAMS, 1990. Species richness in tropical freshwaters of Australia. *Hydrobiologia* 202, 175-183.

"Well, I dunno. . . . OK, sounds good to me."

LETTERS TO THE EDITORS

Dear Editors,

The book review to end all book reviews! I photostatted it, blown up x10, framed it and hung it up in the limnology lab! Keep up to great work. Reading the ASL Newsletter is a great distraction and even beats Sale of the Century! It's not quite up to Home and Away, but I'm sure you understand.

Despite your rosy comments about the cover, I couldn't read it at first. However, by standing on my head and looking in a mirror I found I could read it. Perhaps your readership might like to know this. It gave me a headache, however (not the only thing that does when one is late in life).

William Shakespeare
Adelaide-on-Avon-on-Time

Editorial Reply: Thanks Willie. Nice to know it's appreciated. However, we are not sure whether this letter was in fact written by Shakespeare. It has the ring of Francis Bacon to us. "Keep up to great work" is one of those ye olde Englande expressions that Bacon was so famous for. Anyway, glad to see that being late in life (considering you died in 1616, we suppose that's called late), you can still stand on your head and look in a mirror. We wonder if any other observant readers noted the tricky front page.

Dear Editors,

Not having benefited from the joys of a good private school education I had to resort to my Collins Gem Latin Dictionary to translate the thought for the day (p. 49) :

NO FREE LUNCH

State schools may not teach latin but they do teach us how to read and investigate, and not to expect the above.

Regards,

Jodey Hoey
Maffra

Editorial Reply: Congratulations Jodey! A winner! Now, what was that prize we said we'd send? Oh yes. You now have our respect, Australia Post has your 41 cents, and we've filled this embarrasing little gap in the newsletter.

CHILDRENS CORNER

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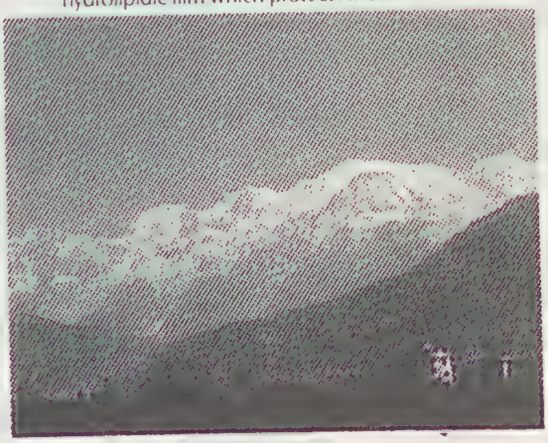

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